

Listing of Claims:

1. (Currently amended) A device activated by biometric authentication, comprising:

a biometric sensor configured to measure a specific, internal, sub-epidermal physiological structure within process of a user from which a biometric marker of said user may be determined, said biometric sensor comprising;

an energy emitter configured to emit an electromagnetic energy signal toward said user, wherein said electromagnetic energy signal is configured to penetrate said user to measure said specific, internal, sub-epidermal physiological ~~structure within process of~~ said user, and

an energy sensor configured to detect an electromagnetic energy signal returned from said user responsive to said emitted electromagnetic energy signal to thereby obtain a measurement of said specific, internal, sub-epidermal ~~structure~~ physiological process; and

a memory module in communication with said biometric sensor comprising a biometric profile of an authorized user of said device,

wherein said device is configured to measure said specific, internal, sub-epidermal ~~of structure within~~ physiological process of said user using said biometric sensor, to determine a biometric marker of said user therefrom, to compare said biometric marker to said biometric profile of said authorized user of said device, and to generate an authentication signal if said biometric marker matches said biometric profile of said authorized user of said device.

2. (Currently amended) The device activated by biometric authentication of claim 1, wherein said device is configured to ~~determine from said measurement of~~ measure said specific, internal, sub-epidermal ~~structure a measurement~~ physiological process of ~~to an internal, and non-volitional physiological process occurring within said user, and wherein said biometric marker is determined using said measurement of said internal, non-volitional physiological process by measuring an internal, sub-epidermal structure within said user.~~

3. (Previously presented) The device activated by biometric authentication of claim 1, wherein said biometric sensor further comprises an activation sensor.

4. (Currently amended) The device activated by biometric authentication of claim 1, wherein said biometric sensor further comprises a translator whereby an energy signal received from said energy sensor is translated into an electronic signal comprising said measurement of said specific, internal, sub-epidermal ~~structure used to determine said internal, sub-dermal biometric marker~~ physiological process of said user.

5. (Currently amended) The device activated by biometric authentication of claim 1, wherein said energy emitter emits electromagnetic energy in the form of ~~[[a]] light~~ [[wave]].

6. (Currently amended) The device activated by biometric authentication of claim 5, wherein said light ~~[[wave is]]~~ comprises infra red light, ultraviolet light, nonvisible light, or visible light.

7. (Currently amended) The device activated by biometric authentication of claim 5, wherein said energy sensor senses light ~~[[waves]]~~.

8-9. (Canceled).

10. (Previously presented) The device activated by biometric authentication of claim 1, wherein said memory module includes a code to trigger an actuator.

11. (Previously presented) A device activated by biometric authentication, comprising:

- a biometric sensor configured to measure a specific, continuous, time-variant, and, sub-epidermal physiological process occurring within a user from which a biometric marker of said user may be determined, said biometric sensor comprising;

- an energy emitter configured to emit an energy signal toward said user, and
 - an energy sensor configured to detect an energy signal returned from said user responsive to said emitted energy signal; and

- a memory module comprising a biometric profile of an authorized user of said device in communication with said biometric sensor, wherein said memory module comprises computer-readable instructions to cause said device to perform a method of authenticating said user, the method comprising;

- emitting a plurality of energy signals toward said user using said energy emitter,
 - detecting a plurality of returned energy signals from said user responsive to said emitted energy signals, wherein said returned energy signals comprise respective measurements of said specific, continuous, time-variant, and sub-epidermal physiological process occurring within said user,

- determining said biometric marker of said user using said measurements of said, specific, continuous, time-variant, and sub-epidermal physiological process occurring within said user;

- comparing said biometric marker to said biometric profile of said authorized user of said device; and

- generating an authentication signal if said biometric marker matches said biometric profile of said authorized user of said device.

12-16. (Canceled)

17. (Currently amended) A biometrically activated and substantially planar card, comprising:

- a first surface and an opposing second surface;

- a biometric sensor integrally contained within said planar card, said biometric sensor configured to obtain a measurement of a specific, internal, sub-epidermal ~~structure within~~ physiological process of a user from which a biometric marker of said user may be determined, said biometric sensor comprising:

 - an electromagnetic energy emitter embedded within said first surface of said planar card, wherein said electromagnetic energy emitter is configured to emit electromagnetic energy capable of penetrating said user ~~to measure an internal, sub-epidermal structure within said user~~, and

 - an electromagnetic energy receiver embedded within said first surface of said planar card;

- an activation sensor embedded within said first surface of said planar card, said activation sensor in electronic communication with said biometric sensor whereby said activation sensor controls an on and an off condition of said biometric sensor;

- a memory module comprising a biometric profile of an authorized user of said planar card embedded within said planar card, said memory module in communication with said biometric sensor; and

- a data communicator embedded within said planar card, said data communicator in communication with said memory module for communicating data to an external source,

wherein said planar card is configured to measure said specific, internal, sub-epidermal ~~structure within~~ physiological process of said user using said biometric sensor, to determine said biometric marker of said user therefrom, to compare said biometric marker to said biometric profile of said authorized user of said planar card, and to transmit an authentication signal to said data communicator if said biometric marker matches said biometric profile of said authorized user of said planar card.

18. (Previously presented) The card activated by biometric authentication of claim 17, further comprising a data screen embedded on a surface of said planar card, said data screen in communication with said memory module, wherein said planar card is configured to activate said data screen responsive to said authentication signal.

19. (Currently amended) A cellular phone activated by biometric authentication, comprising:

a cellular phone having an activated state and an inactivated state controlled by an activation switch;

a biometric sensor embedded within said cellular phone configured to measure a specific, internal, sub-epidermal ~~structure within~~ physiological process of a user from which a biometric marker of said user may be determined, said biometric sensor comprising an electromagnetic energy emitter and an electromagnetic energy receiver positioned on a surface of said cellular phone, wherein said electromagnetic energy emitter is configured to penetrate said user ~~to measure a specific, internal, sub-epidermal structure within said user;~~

a memory module comprising a biometric profile of an authorized user of said cellular phone embedded within said cellular phone, said memory module in communication with said biometric sensor and said activation switch,

wherein said cellular phone is configured to measure said specific, internal, sub-epidermal ~~structure within~~ physiological process of said user using said biometric sensor, to determine said biometric marker of said user therefrom, to compare said biometric marker to said biometric profile of said authorized user of said cellular phone, and to generate an authentication signal if said biometric marker matches said biometric profile of said authorized user of said cellular phone.

20. (Currently amended) A method of authenticating a user, comprising:
~~generating~~ emitting an electromagnetic signal towards a user, wherein said electromagnetic signal is configured to penetrate said user to measure a specific, internal, sub-epidermal ~~of structure within~~ physiological process of said user, wherein an electromagnetic signal is returned from said user responsive to said ~~generated~~ emitted electromagnetic signal, and wherein said returned electromagnetic signal comprises a measurement of said specific, internal, sub-epidermal ~~structure within~~ physiological process of said user;

detecting said returned electromagnetic signal;

translating said returned electromagnetic signal into a biometric marker of said user, wherein said biometric marker[[,]] is embodied as an electrical signal;

transmitting said biometric marker to a memory module comprising ~~having pre-existing stored data thereon, said stored data comprising~~ a biometric profile of an authorized user;

comparing said biometric marker with said biometric profile of said authorized user; and

generating an authentication signal if said biometric marker matches said biometric profile of said authorized user.

21-22. (Canceled)

23. (Currently amended) A method of activating an electrical device based on biometric authentication, comprising:

obtaining a plurality of measurements of a continuous, time-variant, and sub-epidermal physiological process occurring within a user;

determining a biometric marker of said user using said measurements;

creating a user biometric profile of said user, wherein said user biometric profile comprises said biometric marker;

comparing said user biometric profile to a stored biometric profile of an authorized user, wherein said comparing comprises comparing said biometric marker to said stored biometric profile; and

generating an activation signal for said electrical device if said biometric marker of said user matches said stored biometric profile.

24. (Currently amended) A method for generating a coded signal comprising:
emitting ~~a sub-epidermal penetrating~~ electromagnetic radiation ~~beam directed towards~~ an individual, wherein said electromagnetic radiation ~~beam~~ is configured to penetrate said individual to measure a specific, internal, ~~sub-epidermal structure within~~ physiological process of said individual;

~~reflecting said electromagnetic radiation beam off internal, sub-epidermal physiological structure within said individual to produce a detectable return signal;~~

detecting said ~~a~~ return electromagnetic radiation signal, ~~wherein said return signal compris[es]]ing~~ a measurement of said specific, internal, sub-epidermal ~~structure within physiological process of~~ said ~~[[user]]~~ individual;

determining a biometric marker of said individual using said ~~return signal~~ measurement ~~of said return signal~~;

comparing said biometric marker to a stored biometric profile previously developed from said individual; and

generating a coded signal if said biometric marker matches said stored biometric profile.

25-26. (Canceled)

27. (Currently amended) The device of claim 1, wherein said ~~internal, sub-epidermal structure within said user~~ physiological process corresponds to one selected from the group consisting of a ~~histological trait, bone density, cardiac rhythm, a diacritic notch reading, blood oxygen level, capillary density, glucose level, hematocrit level, and sub-epidermal layer analysis structure~~ a heartbeat waveform, and a hemodynamic waveform.

28. (Currently amended) The device of claim 1, wherein said biometric sensor is configured to measure a plurality of different types of specific, internal, sub-epidermal ~~physiological structures within processes~~ of said user.

29. (Currently amended) The device of claim 28, wherein said device is configured to select one of said plurality of different types of specific, internal, sub-epidermal ~~characteristics of structures within~~ physiological processes of said user, to measure said selected one, to determine a biometric marker using said measurement, and to generate an authentication signal if said biometric marker matches said biometric profile of said authorized user of said device.

30. (Currently amended) The device of claim 29, wherein said emitter is configured to prevent identification of said selected one of said plurality of different types of specific, internal, sub-epidermal ~~structures~~ physiological processes measured by said biometric sensor.

31. (Currently amended) The device of claim 28, wherein said device is configured to measure a selected plurality of said plurality of different types of specific, internal, sub-epidermal ~~structures within~~ physiological processes of said user using said biometric sensor, to derive a selected plurality of biometric markers of said user using said selected plurality of measurements, and to generate an authentication signal if each of said selected plurality of biometric markers matches said biometric profile of said authorized user.

32. (Currently amended) The device of claim 1, wherein said biometric sensor is configured to measure a plurality of different types of specific, internal, sub-epidermal ~~characteristics of structures within~~ physiological processes of said user, and wherein said biometric sensor is configured to prevent identification of said plurality of different types of specific, internal, sub-epidermal ~~structures within~~ physiological processes of said user measured by said biometric sensor.

33. (Currently amended) The device of claim 32, wherein the device is further configured to,

select one of said plurality of different specific, internal, sub-epidermal ~~structures within~~ physiological processes of said user,

emit electromagnetic energy from said electromagnetic energy emitter to measure said selected one of said plurality of different specific, internal, sub-epidermal ~~of structures within~~ physiological processes of said user,

receive a returned electromagnetic energy signal from said user responsive to said emitted electromagnetic energy, wherein said returned electromagnetic energy signal comprises a measurement of said selected one of said plurality of different types of specific, internal, sub-epidermal ~~structures within~~ physiological characteristics of said user,

determine a biometric marker of said user using said returned electromagnetic energy signal, and

generate an authentication signal if said biometric marker matches said biometric profile of said authorized user of said device.

34. (Currently amended) The device of claim 32, wherein the device is further configured to,

select a first one of said plurality of different types of specific, internal, sub-epidermal ~~structures~~ physiological processes and a second one of said plurality of different types of specific, internal, sub-epidermal ~~structures~~ physiological processes,

emit a first electromagnetic energy signal from said electromagnetic energy emitter to measure said first one of said plurality of different types of specific, internal, sub-epidermal ~~structures within~~ physiological processes of said user,

receive a returned first electromagnetic energy signal from said user responsive to said first emitted electromagnetic energy signal comprising a measurement of said first one of said plurality of different types of specific, internal, sub-epidermal physiological processes of ~~structures within~~ said user,

determine a first biometric marker of said user using said measurement of said first specific, internal, sub-epidermal ~~structure~~ physiological process,

emit a second electromagnetic energy signal from said electromagnetic energy emitter to measure said second one of said plurality of different types of specific, internal, sub-epidermal physiological processes of ~~structures within~~ said user,

receive a returned second electromagnetic energy signal from said user responsive to said second emitted electromagnetic energy signal comprising a measurement of said second one of said plurality of different types of specific, internal, sub-epidermal physiological characteristics physiological processes of ~~structures within~~ said user,

determine a second biometric marker of said user using said measurement of said second specific, internal, sub-epidermal ~~structure~~ physiological process,

compare said first biometric marker and said second biometric marker to said biometric profile of said authorized user of the device, and

generate an authentication signal if said first biometric marker and said second biometric marker match said biometric profile of said authorized user of said device.

35. (Previously presented) A device activated by biometric authentication, comprising:

- a biometric sensor configured to measure a plurality of different specific, internal, physiological characteristics of a user, said biometric sensor comprising,

- an energy emitter configured to emit an electromagnetic energy signal toward said user, wherein said electromagnetic energy signal is configured to penetrate said user to measure one or more of said specific, internal, sub-epidermal physiological characteristics of said user, and

- an energy sensor configured to detect an electromagnetic energy signal returned from said user responsive to said emitted electromagnetic energy signal to thereby obtain a measurement of said one or more specific, internal, sub-epidermal physiological characteristics of said user; and

- a memory module in communication with said biometric sensor comprising a biometric profile of an authorized user of said device,

- wherein the device is configured to select a first one and a second one of said plurality of specific, internal, sub-epidermal physiological characteristics of said user, emit an electromagnetic energy signal from said electromagnetic energy emitter to measure said first specific, internal, sub-epidermal physiological characteristic, and said second specific, internal, sub-epidermal physiological characteristic, receive a returned energy signal comprising said measurements of said first and second specific, internal, sub-epidermal physiological characteristics of said user, determine a first biometric marker of said user using said measurement of said first specific, internal, sub-epidermal physiological characteristic, determine a second biometric marker of said user using said measurement of said second specific, internal sub-epidermal physiological characteristic, and generate an authentication signal if said first biometric marker and said second biometric marker match a biometric profile of an authorized user of said device.

36. (Previously presented) A device activated by biometric authentication, comprising:

a biometric sensor configured to measure a plurality of different specific, internal, physiological characteristics of a user, said biometric sensor comprising, an energy emitter configured to emit an electromagnetic energy signal toward said user, wherein said electromagnetic energy signal is configured to penetrate said user to obtain measurements of one or more of said plurality of specific, internal, sub-epidermal physiological characteristics of said user, and an energy sensor configured to detect an electromagnetic energy signal returned from said user responsive to said emitted electromagnetic energy signal to thereby obtain measurements of said one or more specific, internal, sub-epidermal physiological characteristics of said user; and

a memory module in communication with said biometric sensor comprising a biometric profile of an authorized user of said device,

wherein the device is configured to select a first one and a second one of said plurality of specific, internal, sub-epidermal physiological characteristics of said user,

emit a first electromagnetic energy signal from said electromagnetic energy emitter to measure said first specific, internal, sub-epidermal physiological characteristic, receive a first returned energy signal comprising said measurement of said first specific, internal, sub-epidermal physiological characteristic of said user using said energy sensor, emit a second electromagnetic energy signal from said electromagnetic energy emitter to measure said second specific, internal, sub-epidermal physiological characteristic, receive a second returned energy signal comprising said measurement of said second specific, internal, sub-epidermal physiological characteristic of said user using said energy sensor, determine a first biometric marker of said user using said measurement of said first specific, internal, sub-epidermal physiological characteristic and a second biometric marker of said user using said measurement of said second specific, internal, sub-epidermal physiological characteristic, generate an authentication signal if said first biometric marker and said second biometric marker match a biometric profile of an authorized user of said device.

37. (New) A device activated by biometric authentication, comprising:
a biometric sensor configured to measure a plurality of different specific, internal, sub-epidermal structures and/or physiological processes of a user, the biometric sensor comprising,

an energy emitter configured to emit an electromagnetic energy signal toward the user, and

an energy sensor configured to detect an electromagnetic energy signal responsive to the emitted electromagnetic energy signal to thereby obtain a measurement of a specific, internal, sub-epidermal structure and/or process of the user; and

a memory module communicatively coupled to the biometric sensor, the memory module comprising a biometric profile of an authorized user of the device,

wherein the device is configured to acquire measurements of two or more of the plurality of different specific, internal, sub-epidermal structures and/or physiological processes of the user using the biometric sensor, to determine two or more biometric markers using the two or more measurements, and to generate an authentication signal when the two or more biometric markers match the biometric profile of the authorized user.

38. (New) The device of claim 37, wherein the biometric sensor is configured to prevent identification by a user of the device of the plurality of the specific, internal, sub-epidermal structures and/or processes measured by the biometric sensor.

39. (New) The device of claim 37, wherein a first one of the two or more biometric markers is substantially unique to the user.

40. (New) The device of claim 39, wherein a second one of the two or more biometric markers is substantially unique to the user.

41. (New) The device of claim 37, wherein the device is configured to determine whether the two or more measurements were obtained from a live human using the first one of the two or more biometric markers.

42. (New) The device of claim 41, wherein the device is configured to assert the authentication signal when the first biometric marker indicates that the two or more measurements were obtained from a live human.

43. (New) The device of claim 41, wherein the device is configured to prevent assertion of the authentication signal when the first biometric marker indicates that the two or more measurements were not obtained from a live human.

44. (New) The device of claim 37, wherein a first one of the two or more measurements comprises a heartbeat waveform.

45. (New) The device of claim 37, wherein a first one of the two or more measurements comprises a capillary pattern.

46. (New) The device of claim 37, wherein a first one of the two or more measurements comprises a blood oxygen level.

47. (New) The device of claim 37, wherein the energy emitter comprises a light emitting diode.

48. (New) The device of claim 37, wherein the energy emitter is configured to emit optical energy in the infra-red spectrum.

49. (New) The method of claim 51, wherein the energy emitter is configured to emit optical energy at one of a plurality of different wavelengths.

50. (New) The device of claim 37, wherein the device comprises a cell phone.

51. (New) The device of claim 37, wherein the device comprises a portable computing device.

52. (New) The device of claim 37, wherein the device comprises a communications device capable of communication with a communications network.

53. (New) The device of claim 52, wherein activating the device comprises causing the device to transmit at least one of the two or more measurements and at least one of the two or more biometric markers on the communications network.

54. (New) A method for authenticating a user of a device comprising a biometric sensor, the method comprising:

- acquiring two or more measurements of different specific internal, sub-epidermal structures and/or processes of an individual using the biometric sensor, the biometric sensor comprising an optical energy emitter and an optical energy sensor, wherein acquiring a measurement comprises,

- emitting an optical energy signal toward the individual using the optical energy emitter, and

- sensing an optical energy signal responsive to the emitted optical energy signal using the optical energy sensor, and

- determining a measurement of an internal, sub-epidermal structure and/or process of the individual using the sensed optical energy signal;

- deriving two or more biometric markers from the two or more measurements acquired using the biometric sensor;

- comparing the two or more biometric markers to a biometric profile of an authorized user of the device; and

- asserting an authentication signal when the two or more biometric markers match the biometric profile of the authorized user.

55. (New) The method of claim 54, wherein the biometric sensor is configured to prevent identification of the specific, internal, sub-epidermal structures and/or processes measured by the biometric sensor.

56. (New) The method of claim 54, wherein a first one of the two or more biometric markers is substantially unique to the individual.

57. (New) The method of claim 56, wherein a second one of the two or more biometric markers is substantially unique to the individual.

58. (New) The method of claim 54, further comprising determining whether the two or more measurements were acquired from a live human using a first one of the two or more biometric markers.

59. (New) The method of claim 58, wherein the authentication signal is asserted when the first one of the two or more biometric markers determines that the two or more measurements were acquired from a live human.

60. (New) The method of claim 59, further comprising preventing assertion of the authentication signal when the first one of the two or more biometric markers determines that the two or more measurements were not acquired from a live human.

61. (New) The method of claim 54, wherein a first and a second one of the two or more measurements are obtained by emitting a single optical energy signal towards the individual using the optical energy emitter of the biometric sensor.

62. (New) The method of claim 54, wherein the optical energy emitter comprises a light emitting diode.

63. (New) The method of claim 54, wherein the optical energy emitter is configured to emit optical energy in the infra-red spectrum.

64. (New) The method of claim 54, wherein the optical energy emitter is configured to emit optical energy at one of a plurality of different wavelengths.

65. (New) The method of claim 54, wherein a first one of the two or more measurements comprises one of a heartbeat waveform, a capillary pattern, a blood oxygen level, sub-dermal layer analysis, a diacrotic notch, and a hematocrit level.

66. (New) The method of claim 54, wherein the device comprises a communications device capable of communication on a network.

67. (New) The method of claim 66, wherein the device comprises one selected of a mobile phone, a portable computing device, and a personal digital assistant.

68. (New) The method of claim 67, further comprising activating the device responsive to deriving the two or more biometric markers, wherein activating the device comprises using the device to transmit one or more of the measurements and one or more of the biometric markers using the device.